

same properties. Applicants respectfully submit this position is without merit and is not supported by any evidence of record. There are many factors that can affect the properties of the resulting polymer particles including, for example, the type and amount of crosslinking agents, the extent of surface crosslinking, processing and polymerization steps and particle size. The Action lacks any evidence to support the position that merely because the polymer particles of Engelhardt et al. are made from an acrylic acid monomer, the resulting water-absorbent resin particles are inherently the same. The Action has not provided an adequate basis to show that the particles are substantially similar, and thus, has improperly shifted the burden of proof to Applicants. Contrary to the assertion in the Action, the Examiner has not established a substantially similar product merely by identifying a monomer. The cases cited in the Action and MPEP § 2113 do not support the Examiner's position.

The present invention is directed to an aqueous-liquid-absorbing agent having improved properties by providing water-absorbent resin particles having four specifically defined properties, namely, (1) an absorption rate (FSR) of not less than 0.2 g/g/s, (2) a water absorption capacity (CRC) of 10 to 20 g/g, (3) a saline flow conductivity (SFC) of not less than  $400 \times 10^{-7} \text{ cm}^3 \cdot \text{s/g}$ , and (4) a wet porosity of not less than 20%. The claimed invention is directed to the combination of each of these properties. The Action provides no evidence to support the position that each of these properties are found either expressly or inherently in the product of Engelhardt et al. based on the disclosure of an acrylic acid monomer.

As noted in the Action, claim 1 recites water-absorbent resin particles having a saline flow conductivity of not less than  $400 \times 10^{-7} \text{ cm}^3 \cdot \text{s/g}$ . Engelhardt et al. refers only to a saline flow conductivity of "at least  $40 \times 10^{-7} \text{ cm}^3 \cdot \text{s/g}$ , and most preferably at least  $80 \times 10^{-7} \text{ cm}^3 \cdot \text{s/g}$ " as disclosed in column 7, lines 32-37. Nowhere does Engelhardt et al. suggest a saline flow

conductivity of not less than  $400 \times 10^{-7} \text{ cm}^3 \cdot \text{s/g}$  as in the claimed invention. The highest saline flow conductivity disclosed in Engelhardt et al. is Example 2 in Table 1 where the particles have a saline flow conductivity of  $86 \times 10^{-7} \text{ cm}^3 \cdot \text{s/g}$ . The claimed invention has a lower limit of the saline flow conductivity that is about 5 times the highest amount disclosed in Engelhardt et al. Thus, Engelhardt et al. does not disclose and does not suggest to one skilled in the art a product having a saline flow conductivity within the claimed range. Nor does Engelhardt et al. suggest that such water-absorbent resin particles can be produced or the desirability of producing such water-absorbent resin particles having saline flow conductivity of not less than  $400 \times 10^{-7} \text{ cm}^3 \cdot \text{s/g}$ . The Action provides no rationale or factual evidence to support the position that it would have been obvious to one of ordinary skill in the art to provide a saline flow conductivity of not less than  $400 \times 10^{-7} \text{ cm}^3 \cdot \text{s/g}$  as in the claimed invention based on the disclosure of Engelhardt et al.

The data presented in Engelhardt et al. demonstrates that all water-absorbent resin particles obtained from acrylic acid are not inherently the same. The data presented in Engelhardt et al. further demonstrates that the water-absorbent resin particles of Engelhardt et al. have a saline flow conductivity that is clearly outside the claimed range.

Applicants have found that a saline flow conductivity of less than  $400 \times 10^{-7} \text{ cm}^3 \cdot \text{s/g}$  inhibits the diffusion of urine or other liquids in the absorbent structures, and thus, is not easily absorbed by diapers thereby causing leakage. See, for example, paragraph 0128 of Applicants' published application. The Comparative Examples 1, 2 and 5-7 shown in Table 2 of the present specification demonstrates the properties of aqueous-liquid-absorbing agents having a saline flow conductivity of less than  $400 \times 10^{-7} \text{ cm}^3 \cdot \text{s/g}$ . As noted above, the saline flow conductivity of the polymers of Engelhardt et al. is significantly below the lower limit of the saline flow

conductivity of claim 1. The data in Table 2 of the present specification demonstrates that the properties as claimed are not inherently the same as the products of Engelhardt et al.

Engelhardt et al. is silent regarding the absorption rate and wet porosity as claimed. The Action provides no factual evidence to support the position that the claimed absorption rate and wet porosity of Engelhardt et al. are inherently the same as the claimed invention. Moreover, the Action presents no basis that one of ordinary skill in the art would have any reasonable expectation of the properties of Engelhardt et al. being inherently the same as the claimed invention. Engelhardt et al. does not disclose or suggest to one skilled in the art that the saline flow conductivity of the particles of Engelhardt et al. fall within the claimed range of not less than  $400 \times 10^{-7} \text{ cm}^3 \cdot \text{s/g}$ . The Action fails to meet the burden of proof of establishing that the combination of (1) an absorption rate of not less than  $0.2 \text{ g/g/s}$ , (2) a water absorption capacity of 10 to 20 g/g, (3) a saline flow conductivity (SFC) of not less than  $400 \times 10^{-7} \text{ cm}^3 \cdot \text{s/g}$ , and (4) a wet porosity of not less than 20% are inherently found in the polymer particles of Engelhardt et al.

Engelhardt et al. is directed to a hydrogel-forming polymer having a specifically defined frangibility index. As shown in Tables 1 and 2 of Engelhardt et al., the saline flow conductivity of the polymers after the frangibility index test are significantly lower than the saline flow conductivity prior to the frangibility index test. Thus, the data presented in Engelhardt et al. demonstrates that the properties of the polymer particles are not the same or substantially the same simply because the polymer is made from an acrylic acid monomer.

For the reasons discussed above, the Action fails to demonstrate that Engelhardt et al. discloses an aqueous-liquid-absorbing agent having the combination of the claimed absorption

rate, water absorption capacity, saline flow conductivity and wet porosity. Accordingly, claim 1 is not obvious over Engelhardt et al.

The particulate shape and the particle diameter of the liquid absorbing agent can have a direct effect on the properties of the aqueous-liquid-absorbing agent. The Action provides no basis for the position that the claimed particulate shape and particle diameters of claim 2 would have been obvious to one of ordinary skill in the art based on the disclosure of Engelhardt et al. either alone or in combination with the features of claim 1. Engelhardt et al. further fails to disclose at least a portion of the water-absorbent resin particles being agglomerate particles as in claim 3, surface-crosslinked water-absorbent particles as in claim 4, or a liquid-permeability-enhancing agent as in claim 5, in combination with the features of claim 1. The Action refers to the crosslinking agents of Engelhardt et al. as allegedly corresponding to a “potential liquid-permeability-enhancing agent”. Engelhardt et al. clearly does not disclose or suggest to one skilled in the art the use of a permeability-enhancing agent. Engelhardt et al. further fails to suggest that the crosslinking agents function as a liquid-permeability-enhancing agent.

Applicants’ specification specifically discloses the liquid-permeability-enhancing agents being a polyvalent metal compound, polycationic compound, and inorganic fine particles. The Action provides no basis that the crosslinking agents of Engelhardt et al. function in the manner of the liquid-permeability-enhancing agent of the claimed invention.

In view of the above comments, Applicants submit that the claims are not obvious to one of ordinary skill in the art over Engelhardt et al.

### **Rejection of Claims 6-8 and 10-13**

Claims 6-8 and 10-13 are rejected under 35 U.S.C. § 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as being obvious over JP 2000-63527 to Yorimichi.

Anticipation requires that each and every limitation of the claim be found expressly or inherently in the cited reference. JP '527 does not disclose expressly or inherently the claimed process step of subjecting the water-absorbent resin that has been dried and pulverized to a treatment step to enhance liquid permeability as in claim 6. The position in the Action that the step of treatment to enhance liquid permeability is a preamble is clearly incorrect. The preamble of a claim is defined as being the portions of the claimed before the word “comprising”. Furthermore, the position in the Action disregards the plain language of the claim. Claim 6 positively recites the process step of “subjecting the water-absorbent resin particles to treatment”. This process step is not in the preamble of the claim. Moreover, the rejection fails to give proper consideration to each of the recited process steps. The reference to enhancing liquid permeability is the functional language defining the treatment step, and thus, limits the treatment step. The position in the Action that the reference to enhance liquid permeability is an intended result is incorrect and misplaced. The rejection cannot disregard the plain language of the claim in order to substantiate a rejection. The cases cited on page 5 of the Action do not support the rejection or the position in the Action. The Action fails to identify where JP '527 discloses a step of treating water-absorbent resin particles with an agent to enhance liquid permeability, and thus, fails to establish anticipation.

The Action further fails to identify where JP '527 discloses either expressly or inherently the step of preparing an aqueous monomer solution of a water-soluble ethylenically unsaturated monomer and an internal-crosslinking agent in an amount of not less than 0.2 mol% as in claim

6. The Action refers to paragraphs 0022 and 0028 of JP '527. These paragraphs do not disclose the claimed amount of the crosslinking agent. Thus, JP '527 does not anticipate claim 6.

Applicants have found that the desired properties of the aqueous-liquid-absorbing agent are obtained by the specific combination of steps, namely, the specifically defined amount of the internal crosslinking agent during the polymerization step, extruding the resulting hydrogel from a perforated structure having perforation diameters in the range of 0.3 to 6.4 mm, drying the resulting pulverized gel particles, and thereafter subjecting the dried water-absorbent resin particles to a treatment step to enhance liquid permeability. The combination of the claimed steps are not disclosed or suggested in JP '527. As disclosed in paragraph 0092 of Applicants' published application, the combination of the amount of the internal crosslinking agent and the perforation diameter provide the unexpected and improved properties of the resulting aqueous-liquid-absorbing agent.

The Examples shown in Table 2 of the present specification, and particularly Comparative Examples 1-3 that use an internal crosslinking agent in an amount outside the claimed range and extrude the gel through a perforation diameter outside the claimed range, produce products that do not have the desired properties. Thus, the data in Table 2 demonstrates the importance of the combination of the claimed amount of the internal crosslinking agent and the perforation diameter.

Comparative Example 1 and Table 2 show that an internal crosslinking agent outside the claimed range and a perforation diameter outside the claimed range produces a product that exhibits a CRC of 25.5 g/g, SFC of  $140 \times 10^{-7} \text{ cm}^3/\text{s/g}$ , and AAP/CRC of 0.9. As noted in the specification, a CRC of more than 25 g/g typically results in the liquid permeability being inferior. See, for example, paragraph 0124 of Applicants' published application. Furthermore,

the SFC being less than  $400 \times 10^{-7} \text{ cm}^3 \cdot \text{s/g}$ , typically results in poor diffusion of urine or liquid in the absorbent structures and can cause leakage. Where the AAP/CRC is less than 1.00, the aqueous-liquid-absorbing agent must be used in a large amount so that the diaper becomes thick. See, for example, paragraph 0126 of Applicants' published application. Applicants have found that the combination of the claimed amount of the internal crosslinking agent and the perforation diameter produce the desired properties of the aqueous-liquid-absorbing agent and as recited in claim 1.

It would not have been obvious to one skilled in the art to modify the process of JP '527 to provide an internal crosslinking agent in the claimed amount and extrude the resulting hydrogel polymer through a die having a perforated plate with a perforation diameter of 0.3 to 6.4 mm as in the claimed invention based on the disclosure of JP '527. The Action does not provide an adequate basis to support the position that the claimed combination of process steps would have been obvious in view of JP '527 and that one of ordinary skill in the art would have a reasonable expectation of success in obtaining the improved properties of the resulting aqueous-liquid-absorbing agent as claimed.

Each of the Examples in JP '527 as shown in Table 2 are outside the claimed range with respect to the amount of the internal crosslinking agent and the perforation diameter. As shown in Table 2 of JP '527, the perforation diameter of these Examples is either 9.5 mm or 24 mm such that each of the Examples use a perforation diameter clearly outside the claimed range. In each of Examples 1-8 of JP '527, the internal crosslinking agent is included in an amount of 0.04 mol% or 0.08 mol% which is significantly lower than the claimed amount of not less than 0.2 mol%. Thus, each of the Examples of JP '527 correspond to the Comparative Example of the aqueous-liquid-absorbing agent 1 of the present invention. The amount of the internal

crosslinking agent used in Examples 1-8 of JP '527 is below the claimed range of 0.2 mol% and the perforation diameter of the perforated plate is greater than 6.4 mm. Thus, the particles produced according to JP '527 have a significantly larger particle size than those produced according to the claimed process, and thus, are not the same and do not have the same properties. Thus, one of ordinary skill in the art would recognize that the CRC, SFC, AAP/CRC of the resulting product of JP '527 are not the same as the properties obtained according to the claimed process. The data presented in the present specification demonstrates that the resulting products obtained according to JP '527 are inferior compared to the properties of the aqueous-liquid-absorbing agent obtained according to the process of claim 6.

One skilled in the art would have no reasonable expectation that a process for producing an aqueous-liquid-absorbing agent using the specifically defined amount of the internal crosslinking agent and the specifically defined perforation diameter would provide the improved and desired properties of the resulting product based on the disclosure of JP '527. Accordingly, Applicants submit that claim 6 is not anticipated by or obvious over JP '527.

The dependent claims are also allowable as depending from claim 6 and for reciting additional features of the invention. JP '527 does not suggest at least a portion of the polarized gel obtained by extruding the hydrogel through perforated structure to obtain agglomerates as in claim 7, or the surface-crosslinking of the resulting water-absorbent resin as in claim 8, either alone or in combination with the process steps of claim 6.

The Action refers to paragraph 0030 of JP '527 for disclosing ethylenediamine or diethylenetriamine in the monomer composition. The basis for this statement is unclear. Claim 10 specifically recites the treatment step adding a liquid-permeability-enhancing agent. The crosslinking agents identified in the Action are not a liquid-permeability-enhancing agent within



the meaning of the claimed invention. Moreover, the position in the Action that JP '527 discloses adding the ethylenediamine to the monomer composition does not render the claimed process obvious to one skilled in the art. Claim 6 specifically recites the treatment step by treating after the polymerization step, after the extruding step, and after the drying step. Thus, the suggestion in the Action that including the ethylenediamine in the monomer mixture prior to the polymerization step does not render the claimed step of treating the polymerized, extruded and dried product obvious to one skilled in the art. Thus, claim 10 is not anticipated by or obvious over JP '527.

Claim 11 depends from claim 10 and specifically recites the liquid-permeability-enhancing agent being selected from the group of a polyvalent metal compound, polycationic compound, and inorganic fine particles. The Action refers to paragraph 0030 of JP '527 for disclosing ethylenediamine or ethylenetriamine. The ethylenediamine or ethylenetriamine of JP '527 is clearly not a polyvalent metal compound, polycationic compound or inorganic fine particle as in claim 11. Thus, claim 11 is not anticipated by or obvious over JP '527.

JP '527 also does not suggest the monomer concentration of claim 12, or the amount of the water-soluble ethylenically unsaturated monomer of claim 13, either alone or in combination with the process steps of claim 6.

In view of the above comments, the claims are submitted as being allowable over the art of record. Accordingly, reconsideration and allowance are requested.

Respectfully submitted,



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